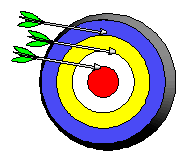
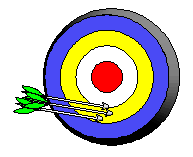
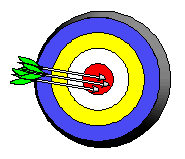
**Scientific Method and Measurement Lab**

**CP Physical Science – Mr. Rita**

Answer with the best response on the following multiple choice questions. Darken in only one circle, and be sure to erase completely if you change an answer. (1 point each)

1. At the beginning of the year, we did an exercise that stated that,

“Science begins with \_\_\_\_\_\_\_\_\_\_ and often ends with \_\_\_\_\_\_\_\_\_\_\_.”

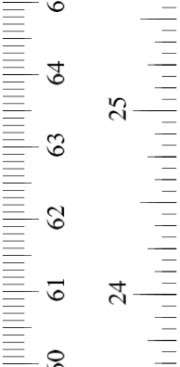
1. hypothesis, variable c. curiosity, discovery
2. variables, conclusion d. questions, excuses
3. In the beginning of the year we constructed boxes that were 6 fingers x 6 fingers x 6 fingers. What was the focus of this activity?
   1. To see how to build a box.
   2. To see the benefit of using a standard unit if measure.
   3. To interpret graphs.
   4. To investigate density.
4. This is the 2nd step in the scientific method. It is a statement that you make about an observed event and will base your test, analysis and conclusion on.
   1. Question c. Conclusion
   2. Hypothesis d. Test
5. You have conducted a single experiment about light and its affects on roof temperature. Your conclusion agrees with your hypothesis. What should you do next?
   1. Go back and do several more tests.
   2. Put your equipment away, you’re done.
   3. Form a new hypothesis.
   4. Begin to develop a theory.
6. It’s the year 2525 and there have been great discoveries supporting the theory of Plate Tectonics. With these new developments, what will happen to this theory?
   1. It will remain a theory c. It will become the Law of Plate Tectonics.
   2. It will be dismissed d. It will mean disaster for the Earth.
7. Fill in the blanks for the following: Laws \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Theories \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
   1. describe, explain c. are accurate, are precise
   2. conclude, test d. punish, reward
8. Which illustration below shows accuracy, but not precision?
   1.  b.  c. 

**Use the following situation to answer questions 8 through 12.**

A student wonders what temperature water is best for dissolving the most salt. She decides to try 10 trials of water temperatures. 10°C, 20°C, 30°C, 40°C, 50°C, 60°C,……………..100°C. Each sample is stirred for 1 minute. After 1 minute the number of crystals of salt remaining is recorded. The graph below is the data that was analyzed to arrive at a conclusion.

0 0 0 0 0 0 0 0 0 0

1. Which below would be an appropriate hypothesis for this experiment?
   1. What temperature is best to dissolve salt in water?
   2. Stirring water for 1 minute will dissolve salt in water fastest.
   3. I think that maybe, perhaps, hot water will dissolve salt in water faster than cold water.
   4. Water of 50°C will dissolve 100% of the salt within 1 minute.
2. What would be the best selection for the Manipulated Variable for this experiment?
   1. The temperature of the water.
   2. The time the liquid is stirred.
   3. The amount of salt left.
   4. The amount of water used in the experiment.
3. What would be the best selection for the Responding variable for this experiment?
   1. The temperature of the water. c. The time the liquid is stirred.
   2. The amount of salt left. D. The amount of water used in the experiment.
4. According to the graph, at what temperature were there 30 salt crystals remaining?
   1. 43°C c. 48°C
   2. 67°C d. 100°C
5. Which below would be a good way to begin a conclusion for this experiment?
   1. When attempting to dissolve salt in water, the optimal temperature would be 67°C.
   2. When attempting to dissolve salt, cold water should be used.
   3. Water of 50°C is not the optimal temperature to completely dissolve salt within 1 minute, a temperature of 70°C is completes the task.
   4. The hotter the water, the better salt will dissolve.
6. What is the measurement indicated by the arrow in Fig A?
7. 63 cm c. 63.2 cm
8. 63.3 cm d. 63.5 cm



15. How many centimeters are there in one inch? (Be precise!)

a. 2 cm c. 2.5 cm

b.2.54cm d. 63.5 cm

14. What is the accepted error for this measurement device seen in Fig A?

a. + 0.5 m c. + 1.0 cm

b. + 0.5 mm d. + 1.0 mm

**Fig A**

1. One of the qualities that makes the metric system so easy to use is that it’s easy to convert between units, since it is based on this number.
   1. 1 c. 2.54
   2. 10 d. 100
2. Which is the metric prefix for 1000?
   1. Milli c. Centi
   2. Deci d. Kilo
3. Which is the metric prefix for 1/100?
   1. Milli c. Centi
   2. Deci d. Kilo

**Density Problems: Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |
| --- | --- |
| **Substance** | **Density (g/ml)** |
| Gold | 19.30 |
| Ice | 0.92 |
| Bronze | 8.02 |
| Clay | 1.3 |

1. A block of a certain substance measures 3cm x 12cm x 4cm. It has a mass of 132.5g.

What is the density of the block?

*Menu (3) Working Equation (1) Plugged Numbers (2) Answer w/units (2)*

D =

M =

V =

1. You buy an Olympic gold medal at a garage sale. The seller assures you it’s his 1910 gold medal he won for Curling. You think the medal is actually a bronze medal. You check the mass and find that it is 250 grams and has a volume of 31.2 ml. What is the density of the medal? Is it actually gold?

*Menu (3) Working Equation (1) Plugged Numbers (2) Answer w/units (2)*

D =

M =

V =

1. As your final exam for Art class, you decide to make a clay bust of Mr. Rita. You estimate that you will need at least 150cm3 of clay to complete the project (*no fat-head jokes please*). Mr. Leonard only distributes clay by mass. What mass of clay will you need?

*Menu (3) Working Equation (1) Plugged Numbers (2) Answer w/units (2)*

D =

M =

V =

**Free Response**

Using the experiment described above in numbers 8 to 12, answer the following question in complete sentences. (That means you need to write more than one sentence)

Often a great experiment overlooks one small flaw that makes the conclusion less strong than it appears. For instance, an experiment was once done to see if speaking to a plant in different tones (mean vs. pleasant) affected the plant’s growth. The plant that was spoken to meanly grew less hearty. As it turned out, care for the plant was also affected by the caregiver’s emotions. The plant that was spoken to in a mean tone was also watered less and abused.

1. What do you see as a problem that can make this experiment’s conclusion invalid? Re-read the experiment and what it was trying to prove? (5 points) *(hint: think about the size of the solids used)*

**1 Point Bonus:**

Spell out your mnemonic for the Scientific Method.